Precision Strike

19-20 April 2005

EXCALIBUR XM982

Presented To:

Precision Strike Association
Annual Programs Review

Presented By:

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Distribution A. Approved for public release; distribution is Unlimited

Excalibur Basics

- 155 mm Precision-Guided Extended Range Munition for Cannc
- Cooperative development
  - ✓ USA and Sweden
- Family of Munitions

UNITARY
Block I

SMART
Block II

DISCRIMINATIN
G
Block III

Raytheon

TACOM ARDEC

BOFORS DEFENCE

TSM CANNON

FMV

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Block I Variants and Requirements

- **Block Ia-1** Initial Capability
- **Block Ia-2** Improves on Ia-1 performance; more reliable, capable of higher charge level, tested anti-jam
- **Block Ib** Compact guidance section; more capable, more reliable, lower cost, could add SAL seeker

	Unitary Block		
Capability	**Block Ia-1**	**Block Ia-2**	**Block Ib**
Delivery Accuracy	10-20m CEP(U)	10-20m CEP(U)* 20-30m CEP(J)	10m CEP(U)* 20m CEP(J)*
Range	30-35 km	39-cal: 30-40 km 52-cal: 50-60 km	39-cal: 35-40 km* 52-cal: 50-60 km
Reliability	>60%	85+%*	90+%*
Effectiveness	ORD Threshold (M107)	ORD Threshold* (M107)	ORD Threshold* (M107)
Platform & Charge	LW155 (TAD) Paladin MACS 3-4	LW155 (TAD) Paladin NLOS-C FH77BD MACS 3-5	LW155 (TAD) Paladin NLOS-C FH77BD MACS 3-5

*Denotes KPPs in addition to Interoperability-Top Level IERs. Block Ia-1 has no KPPs.

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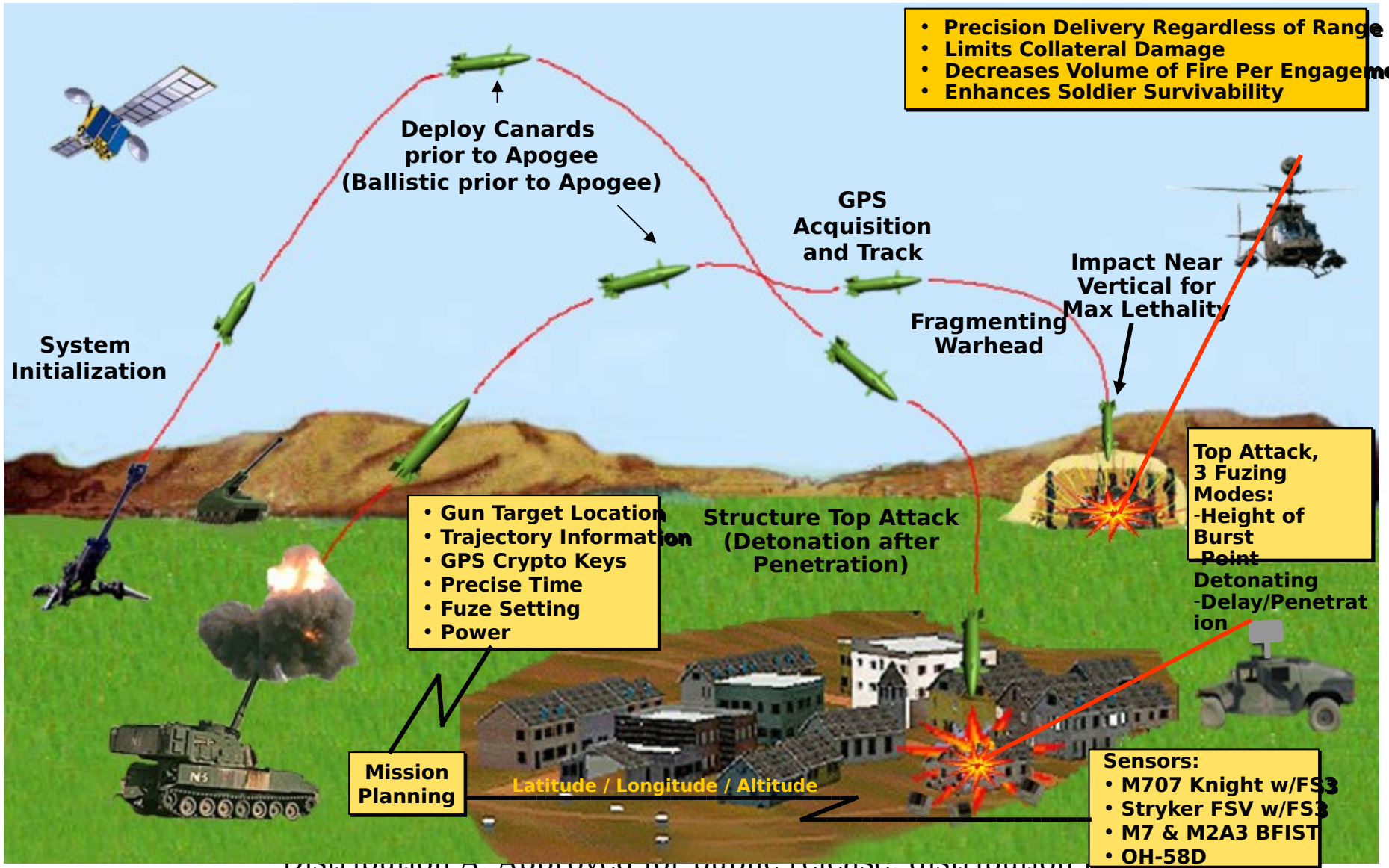
Concept of Operations



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Excalibur Operational Scenario

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Excalibur Unitary Targets

- ~10m CEP
- Same lethality as an 155 mm HE

Excalibur is used in a complex target environment!

Infantry Platoon

Excalibur: 3 rounds
M549: 25 rounds
M107: 43 rounds

Command Post

Excalibur: 6 rounds
M549: 54 rounds
M107: 78 rounds

Excalibur at any range

M549 at 20Km

M107 at 15Km

Radar

Excalibur: 1 round
M549: 10 rounds
M107: 11 rounds

Structures

Excalibur: 3 rounds
M549: 147 rounds
M107: 110 rounds

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Range and Gun Compatibility

- 155 mm, 39 caliber
  Range 30 – 40 km
- US Amy
  155 JLW
  M109A6 Paladin
  FCS NLOS-C

- 155 mm, 52 caliber
  Range 50 – 60 km
- Swedish Army
  FH77BD

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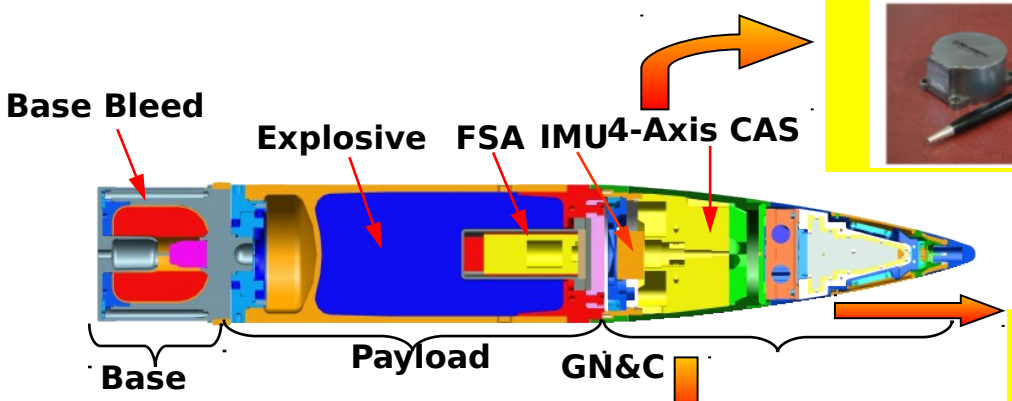
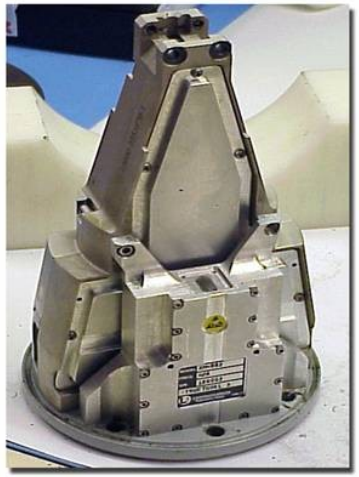
Technical Progress Summary 1

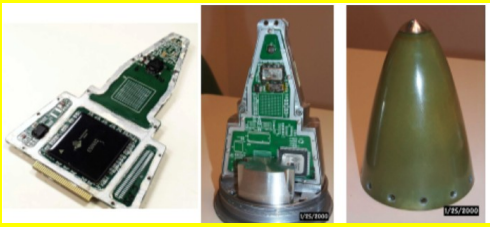


Inertial Measurement

- ✓ IMUs survived tests at MACS-5
- ✓ Continuing with 2 vendors
  - ✓ Honeywell
  - ✓ BAE



Guidance &

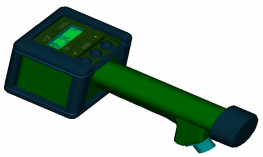


- ✓ GNU Electronics demonstrated gun-hardening gun firing tests (MACS-5)
  - ✓ Mission Computer
  - ✓ Power Conditioning Unit
  - ✓ GPS Receiver
  - ✓ AI Boards

Canard Actuator System (CAS)

- ✓ Survived Overstress Airgun Test, 17kGs and Gunfire at MACS 4
- ✓ Canards deployed & guided to target during GG-A

EPIAFS



- ✓ Completing design of EPIAFS and Platform Integration Kit (PIK)

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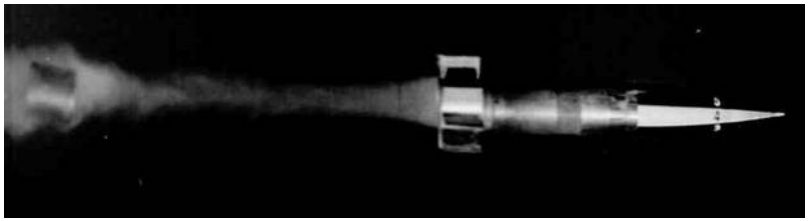
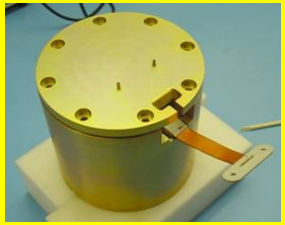
Technical Progress Summary 2

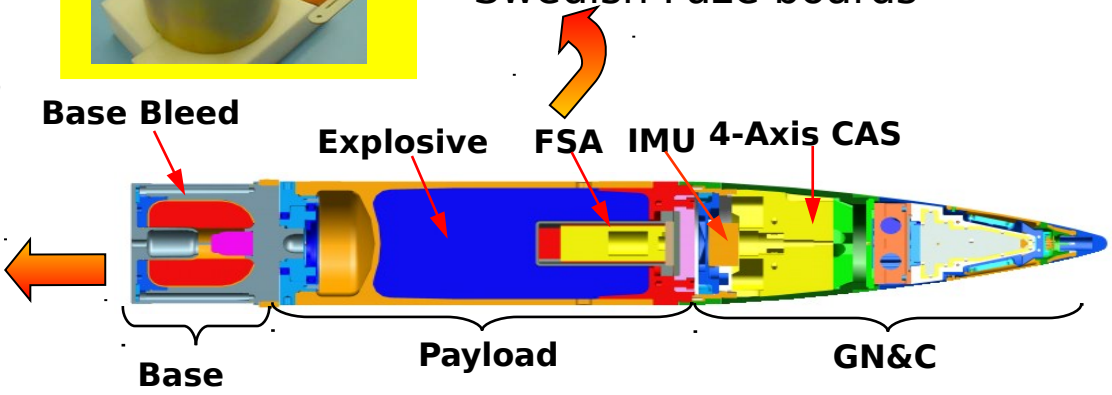


Fuze Safe & Arm



- ✓ Tactical design established
- ✓ Second Arming defined
- ✓ Accepted by US & Swedish Fuze boards

Base with Fins

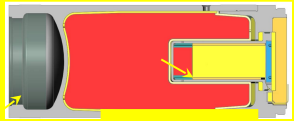


- ✓ MKI.5 Base with Roll Control tested – will support upcoming tests
- ✓ Base Bleed tested

Container

- ✓ Successful ContainerCritical Design Review; Meets all Requirements
- ✓ Pallet Testing Underway

Unitary Payload



- ✓ 1st design iteration arena, penetration and IM tests complete

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ACCURACY:
Demonstrated at Guided Gunfire A Test Series

Range to target: 20 Kilometers

Objectives

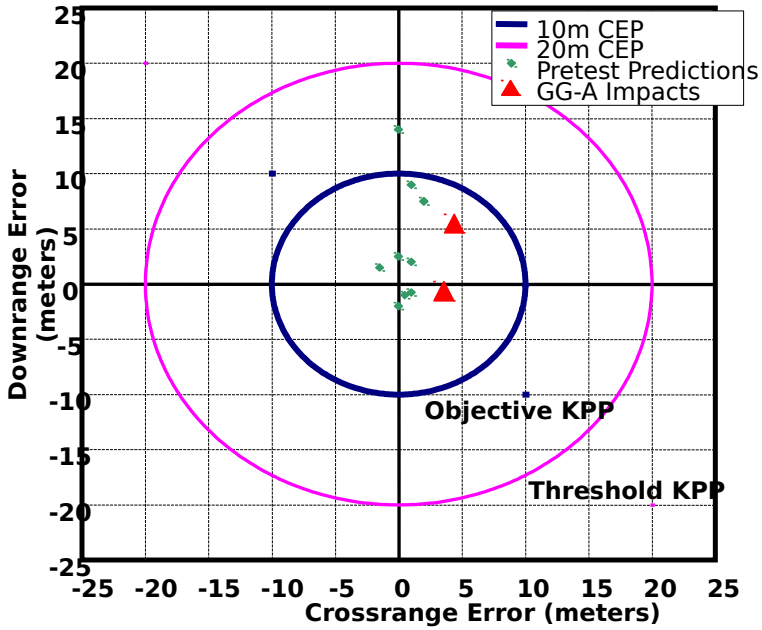
- Demonstrate that projectile de-rolls when commanded, correctly orients, acquires GPS, calculates a navigation solution and guides a non-ballistic trajectory to a point on the ground

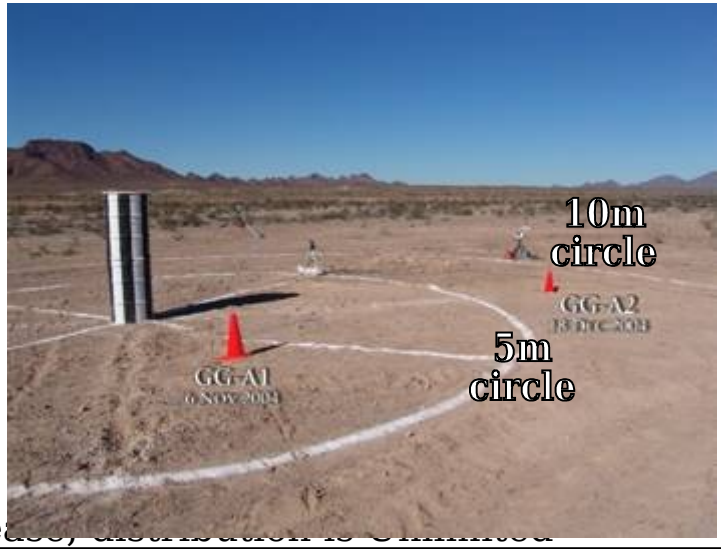
Configuration

- 3 Projectiles fired at MACS-4 charge from LW155 & Paladin cannons
  - Guidance & Navigation Unit (GNU)
    - Tactical computer & flight software
    - C/A Code (civilian) GPS
  - Tactical Canard Actuator System (CAS)
  - Encrypted Telemetry System (in place of tactical HE warhead)

Results

- ✓ <u>All objectives successfully met</u>; 2 of 3 rounds impacted in target area
  - ✓ Demonstrated Accuracy: 3.4m & 6.9m
  - ✓ Full Functionality of Guidance and Navigation System
  - ✓ Guided to Programmed Target Location
  - ✓ Performed Terminal Tip over Maneuver over Target
  - o Projectile #2 flew ballistic
    - Shortcoming of GPS C/A code caused large change in navigation solution, went into safe mode





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Guided Gunfire A Test

GG-A

Shot #3

18 Dec 2004

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Major Upcoming Test Events

- Lethality Demo – June
  - First Guided Flight with HE Warhead
- Guided Gunfire B
  - Demonstrate initialization, projectile flight performance and Fuse Mode functionality
  - Various ranges and charges
  - Exposure to environmental conditioning
- Sequential Environmental Tests - Safety
  - Extreme environmental conditioning
  - Loose cargo and drop testing
  - Fired at charges up to PIMP+5%

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Support to the Warfighter

- Commanders in the CENTCOM AOR want a capability forA cannon fired precision munition
  - ✓ Immediately responsive precision fires
  - ✓ Munition with limited collateral damage
- The Army Staff has asked PM Excalibur to accelerate testing and fielding
- Value to Warfighter
  - ✓ Allows destruction of high-payoff targets in urban & complex terrain
  - ✓ Minimizes collateral damage
  - ✓ Reduces risk to friendly forces in close fight
  - ✓ Responsive; organic to UA Brigade
  - ✓ All weather capability
  - ✓ Fly to grid capability; no laser required

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Questions?

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